Dec. 15, 1953 P. MILLER 2,662,559

PILE FABRIC

Filed May 17, 1951

Fig. 1.

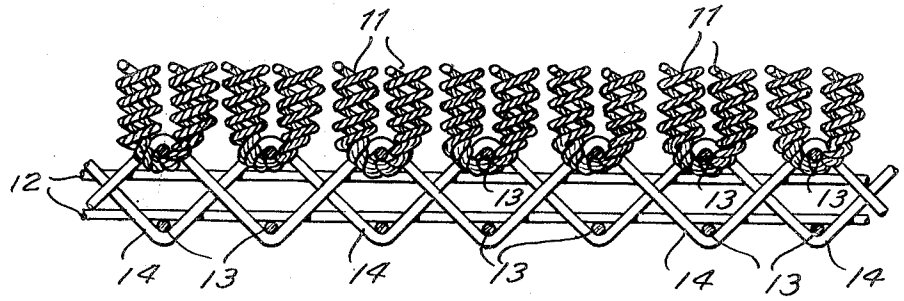
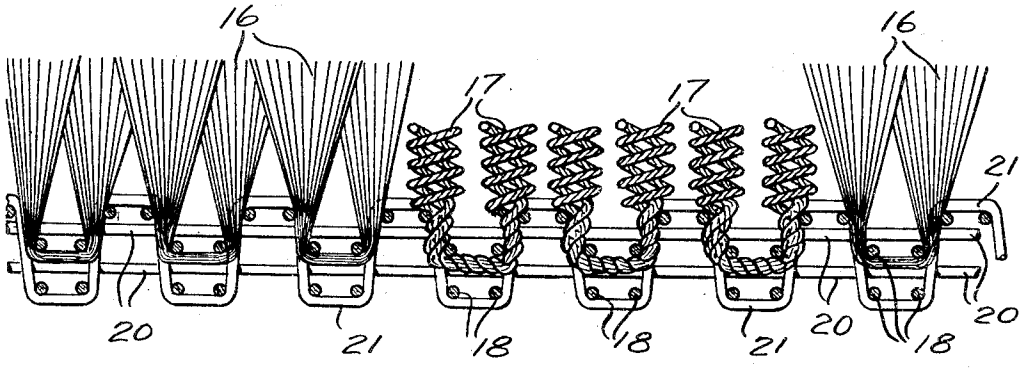


Fig. 2.



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Patented Dec. 15, 1953

2,662,559

UNITED STATES PATENT OFFICE

2,662,559

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Application May 17, 1951, Serial No. 226,854

2 Claims. (Cl. 139—391)

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The present invention relates to the production of a coiled wool yarn and to fabrics embodying such yarn.

This application is a continuation-in-part of Serial No. 182,839 filed September 1, 1950, now abandoned, for Method for Producing Curled Yarn.

One object of the present invention is to provide a new and improved method of producing a coiled yarn.

Another object is to provide a coiled yarn having new and improved characteristics.

Another object is to provide a method of producing a pile fabric having new and improved characteristics.

In accordance with this invention, a coiled yarn is produced by twisting in one direction a roving obtained from the woollen or worsted system on a spinning frame to form a single or individual end, combining two or more such ends and twisting the same on a redoubling frame in the same direction to impart a hard or tight twist to the redoubled or plied yarn, setting the high twist and then reverse twisting the yarn. When the resulting yarn is relaxed the individual ends will separate and coil into interleaved helical form.

It has been found that the yarn thus produced will have superior fullness, affording thereby greater coverage of the fabric backing or body and will also have permanency of coil form improved over similar yarns having other twist combinations.

The novel features of the invention will be better understood from the following description taken in connection with the accompanying drawings, in which specific embodiments have been set forth for purpose of illustration.

In the drawings:

Fig. 1 is an enlarged vertical section of a pile fabric of the type woven on a pile wire or Jacquard loom and embodying the present invention; and

Fig. 2 is an enlarged vertical section of an Axminster pile fabric embodying the present invention.

In accordance with the present invention each of the singles is formed by spinning a woollen or worsted roving on a spinning frame to produce a twist, for example of about five (5) turns per inch in one direction. The twisted singles are then combined or redoubled and given a redoubling twist in the same direction as the initial singles twists, for example, of about seven and one half (7½) turns per inch. The amount of

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twist depends upon the size and type of yarn, but should be sufficient to impart a hard twist to the plied yarn. After this redoubling operation, a temporary or permanent set is given to the plied yarn and the yarn is given a reverse twist of a number of turns sufficient to pass the zero twist point and to impart a loose twist in the reverse direction, as for example, of one and one-half (1½) turns per inch. In the reverse twisted yarn thus formed the plies will tend to separate and coil into interleaved helices when released from tension.

It has been found in accordance with the present invention that after redoubling the yarn as described, a temporary set, such as that imparted by scouring or washing with hot water and drying will be sufficient to cause the creation of a coiled yarn after the redoubled yarn is reverse twisted and relaxed.

It has also been found that the ordinary set produced by simple mechanical stressing through application of a hard twist in the redoubling operation will cause the formation of a coiled yarn upon reverse twisting and relaxing.

After the redoubled yarn has been given a temporary set and a reverse twist in the manner described, it may be reeled into skeins and the skeins removed from the reel to relieve the tension on the yarn and to cause it to relax and collapse into tensionless coiled state. The coil of the yarn may then be permanently set by steaming or dyeing in skein relaxed form. The coiled yarn may then be woven under tension as pile warp on a velvet or Jacquard loom or may be spooled, given a temporary straight set and woven as pile on an Axminster spool loom. In either case, the yarn resumes its coiled form when relaxed.

If the yarn, after redoubling is permanently set, as for example by steaming and/or dyeing, and the permanently set redoubled yarn is reversely twisted, it will form permanent coils on relaxing. Hence, it may be woven under tension and relaxed or may be straight-set, woven and relaxed by removing the straight-set. In either case, it will coil when relaxed and when woven as pile in a pile fabric, will form coiled pile tufts of the type herein described.

In Fig. 1 the twisted yarn is shown woven as pile tufts in a floor covering of the velvet type. In the specific form shown, the fabric includes twisted pile tufts 11 with the plies coiled into interleaved helical form and produced in accordance with the method of the present invention, as described. The rug is shown for the

purpose of illustration as of the 2-shot velvet type with two stuffer yarns 12, upper and lower single weft or filler shots 13 and two chain yarns 14, but it should be understood that the weave may be varied in a manner permitted by a loom of the pile wire or Jacquard type. In a Jacquard loom for example the coiled tufts may be combined with standard tufts to give a sculptured effect.

In producing the pile fabric of the present invention on a pile wire loom, the yarn with the reverse twist and prepared as described, is wound on the warp beam of a pile wire loom and is woven as pile loops while under tension over the wires of the loom. The withdrawal of the wires cuts the pile loops and causes thereby the legs of these loops to relax into the coiled interleaved helical condition shown in Fig. 1.

In Fig. 2, the reverse twisted yarn of the present invention is shown woven as pile in an Axminster pile fabric. In the specific form shown, the fabric includes the combination of standard pile tufts 16 and reverse twisted pile tufts 17 coiled into interleaved helical form and produced in accordance with the method of the present invention, as described. These coiled pile tufts 17 produce a sculptured or intaglio effect with respect to the standard pile tufts 16. The fabric is shown including three double weft or filler shots 18 for each row of pile tufts 16, two stuffer yarns 20 and a chain yarn 21. It is to be understood that the weave may be varied as permitted in standard Axminster practice and that a specific arrangement has been shown only for the purposes of illustration.

In producing the Axminster pile fabric shown in Fig. 2, the yarn with the reverse twist and prepared as described is given a temporary set while in a straightened or tensioned state, as by moistening and drying under appropriate conditions. In this temporary straightened condition, the yarn ends are readily drawn through the tubes of the Axminster loom spools and woven in the conventional manner. The resultant Axminster fabric may include a combination of standard tufts 16 and reverse twisted tufts temporarily set in straightened form. The fabric is then given the usual finishing process, such as cleaning and steaming. This operation does not affect the standard tufts, but removes the temporary set from the reverse twisted tufts, whereupon the latter relax and the plies separate and coil into the interleaved helical form shown in Fig. 2.

The yarn made as described above has an increased coverage. At the same time, the level of permanency of coil is high, particularly when the high twist in the redoubled yarn is permanently set, because the reverse twist tends to decrease the original high twist and the yarn tends to return to such high twist state when the reverse twist set is relaxed during use as by shampooing. It is to be understood of course that wool as used herein includes a wool blend.

What is claimed is:

1. A pile fabric comprising a backing and pile tufts secured therein, at least some of said tufts comprising yarns having two or more plies with a final plying twist of a given hand but being preset with an initial plying twist of the opposite hand, the individual plies having a singles twist of said opposite hand, said tufts having upstanding legs in which the individual plies are separated and coiled in interleaved helical form due to having been under a strain resulting from said preset initial twist of opposite hand.

2. A pile fabric comprising a backing and pile tufts secured therein, some of said tufts having straight upstanding legs, others of said tufts comprising yarns having two or more plies with a final plying twist of a given hand but being preset with an initial plying twist of the opposite hand, the individual plies having a singles twist of said opposite hand, said other tufts having upstanding legs in which the individual plies are separated and coiled in interleaved helical form and pulled down below the level of said first tufts due to having been under a strain resulting from said preset initial twist of opposite hand.

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